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The relationship between mindful eating, intuitive eating and orthorexia nervosa in adult individuals

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ABSTRACT

Aims: This study aimed to investigate the mindful eating, intuitive eating and orthorexia nervosa relationship among adult individuals.

Methods: Two hundred and seventy individuals working in a hospital (165 healthcare workers and 105 administrative staff) joined this cross-sectional research carried out between July and August 2023. The researcher collected the data from the participants in person. A descriptive facts form about participants' sociodemographic characteristics and anthropometric measurements, the Intuitive Eating Scale, the Orthorexia Nervosa Scale, and the mindful eating questionnaire were utilized to gather data.

Results: Participants' mean age was 35.27±10.22 (min.: 20 and max.: 58) years. In this study, 75.9% were female. The mean body-mass index (BMI) was 25.12±4.75 (min:15.58 and max: 40.40) kg/m². Participants BMI distribution was 4.4%, underweight; 52.2%, normal weight; 28.1%, overweight; 11.9%, first-degree obesity; 2.2% (six participants), second-degree obesity, and 1.1% (three participants), severe obesity. The mean Orthorexia Nervosa Scale total score had a positive, very weak association with the average values of emotional eating sub-domain (r: 0.233, p=0.000) and a very weak and negative association with conscious eating sub-domain (r:-0.122, p=0.046) of the mindful eating questionnaire. The mean scores on the total Orthorexia Nervosa and intuitive eating scales had a very weak and statistically meaningful positive association (r: 0.175, p=0.004). The mean mindful eating and the intuitive eating measure figures showed a statistically meaningful, low-level, and positive association (r: 0.480, p=0.000).

Conclusion: As tendency to orthorexia increased, their intuitive eating and emotional eating, a sub-domain under the mindful eating measure, decreased. Additionally, it was discovered that mindful eating rose in parallel with intuitive eating. The development and application of mindful and intuitive eating techniques in conjunction and doing more extensive research on the topic are crucial in the treatment of eating disorders like orthorexia nervosa.

Keywords: Orthorexia nervosa, intuitive eating, mindful eating, emotional eating

INTRODUCTION

In the last decade, there has been an increase in the emphasis on healthy eating and decision-making accordingly.[1] The preference for eating healthy foods is not a disorder in itself, but it is thought that the obsession with these foods, moderation, loss of balance, and isolation from life caused by this eating habit may result in orthorexia nervosa (ON).[2]

The increasing tendency towards ON today often causes a decrease in awareness about eating.[1] Mindful eating is 'consuming foods in return for satiety and hunger being aware of the impact of feelings and deliberations, understanding why and how eating behavior arise instead of just focusing on eating and the specific food consumed, free from the impacts of environmental factors, centering on the food to be consumed here and now, and avoiding judgments or criticism of food choices'.[3] The individual study involving mindfulness-based and informed interventions on eating behaviors and related disorders have pointed to the existence of a negative eating disorder and mindfulness association and underlined a comprehensive mindfulness and ON link.[4] Apart from these findings, the study have shown that intuitive eating behaviors decrease with an increase in the tendency toward ON.[5] People with eating disorders may have trouble recognizing and differentiating interoceptive cues like hunger and fullness, and people with orthorexia may also have this issue.[6] Controlling and developing intuitive eating behaviors will successfully improve individuals' concerns about eating, and the process will be better managed in ON.[7] In addition,

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mindful eating and intuitive eating potentially emerge as a solution to overcome incongruent dietary restrictions. Supporting this, the study has shown that individuals with higher intuitive eating exhibit higher mindful eating levels.[8] Improved psychological health markers, like higher self-esteem, greater acknowledgment of body and image, and reduced disordered eating behaviors, are associated with mindful and intuitive eating.[9] Exploring mindful eating, intuitive eating, and ON connections in adults was the objective of the present research.

METHODS

Ethics

In order to conduct the research, the approval of the İstanbul Okan University Health Sciences Institute Ethics Committee was obtained (Date: 10.05.2023, Decision No: 166). In addition, permission was obtained from the Antalya Provincial Health Directorate to conduct the study at Manavgat State Hospital (Date: 12.07.2023, Number: E-98360293-604.01.02-219609367). Individuals were given comprehensive information about the content of the study and signed a written consent form stating that they participated voluntarily. The research adhered to the Declaration of Helsinki principles.

Study Design and Participants

This cross-sectional study was conducted between July 15 and August 15, 2023. Volunteers aged between 20 and 64, not breast feeding or pregnant, and with no chronic disease joined the research. There were 900 people in the population of the research (550 healthcare workers and 350 administrative staff) working at Manavgat State Hospital. A power analysis was performed on the G*power software to find the smallest number of subjects and eventually it was estimated to be 266, considering a power value of 90%, an alpha value of $\alpha=0.05$, an effect size of $f=0.4$, and $1-\beta=0.90$.[10] Eventually, the study was completed with 270 adult volunteers. The research was thoroughly explained to the subjects, and their agreement statement was collected in writing.

Measures

The researcher collected the data from the participants in person. Data about individuals' sociodemographic and anthropometric characteristics were gathered with a 25-item descriptive facts form. Three other scales were used in the study, one with 30 questions to measure mindful eating, another with 23 questions to assess intuitive eating, and the last one with 11 questions to evaluate the tendency to ON.

The descriptive information form had items about sociodemographic (age, gender, marital status, education level, and occupation) and anthropometric characteristics (body weight (kg), height (cm), body-mass index (BMI), basal metabolic rate (BMR), body fat percentage (%)). Individuals' body weights (kg), body fat percentages (%), BMRs were calculated using the body analyzer "Tanita TT 730". BMI calculation formula was (body weight (kg) / (height $(m)^2$). The BMI classification of the World Health Organization (WHO) was utilized[11]: <18.5 kg/m^2=underweight; 18.5-24.9 kg/m^2=normal weight; 25-29.9 kg/m^2=overweight; 30-34.9 kg/m^2=first-degree obesity; 35-39.9 kg/m^2=second-degree obesity; and >40 kg/m^2 as=severe obesity.[11]

The Mindful Eating Questionnaire (MEQ-30)

Framson et al.[12] designed this scale. It consists of five sub-factors and 28 four-point Likert items. Higher scores mean higher mindful eating. Köse et al.[3] did the Turkish reliability-validity analyses of this measure under the name MEQ-30. The scale has 30 questions, seven sub-domains, and a five-point Likert-type evaluation structure[13] (never: 1 to always: 5). The factors and their items were disinhibition (items 4, 14, 17, 20, and 26); emotional eating (items 21, 22, 23, 28, and 30); eating control (items 3, 6, 27, and 29); mindfulness (items 8, 9, 12, and 13-15); eating discipline (items 1, 18, 24, and 25); conscious eating (items 2, 7, 11, 16, and 19); and interference (influence by external factors) (items 5 and 10). There are 20 reverse items on the scale. A high score of ≥3 on a sub-factor indicates that the individual has the characteristics assessed by the relevant sub-domain. High scores on all sub-factors are interpreted positively. For example, an individual with a high score on "emotional eating" can cope with emotional eating. The arithmetic averages of the sub-domains and the total score are calculated to obtain total sub-factor and scale scores. This scale gives a total mindful eating score.[13]

The Intuitive Eating Scale-2 (IES-2)

This instrument reflects nutritional behaviors impacted by physiological hunger and fullness prompts, rather than by situation or emotion-based triggers.[14] Hawks et al.[15] created the original version of the scale, but it was seen that the scale had a low alpha coefficient and did not provide enough reliability in repeated tests. Tylka[16] designed the intuitive eating scale-1. It consisted of twenty-one questions and three sub-domains. The intuitive eating scale-2 was created by Tylka and Van Diest[17] by modifying and developing the intuitive eating scale-1. Bas et al.[18] performed the Turkish validity-reliability examination of this latest version. This adapted version has four sub-domains and 23 questions, each of which is scored using five-point Likert options in the range of strongly disagree to strongly agree. The sub-factors of the scale are unconditional permission to eat (UPE) (items 1, 3, 4, 9, 16, and 17), eating for physical rather than emotional reasons (EFPR) (items 2, 5, 10, 11, 12, 13, 14, and 15); reliance on hunger and satiety cues (RHSC) (items 6, 7, 8, 21, 22, and 23); and body-food choice congruence (BFCC) (items 18, 19, and 20). There are seven reverse items on the scale (items 1, 2, 4, 5, 9, 10, and 11), and they are scored in reverse. High scores show high intuitive eating levels. A score can be calculated for each factor. Sum of item scores divided by 23 gives the scale score. Overall Cronbach's α was estimated as 0.89 for women, 0.83 for men, and 0.82 regardless of gender.[18]

The Orthorexia Nervosa Scale-11 (Orto-11)

A 10-item orthorexia short questionnaire was created by Bratman.[19] The statements on this questionnaire were developed and evaluated by Donini et al.[2] and the ortho-15 scale was created. Donini et al.[20] designed the 11-item ON "orto-11" Scale by removing some items from the original form and changing some others. Arusoğlu et al.[21] did the Turkish adaptation and the reliability-validity studies of the ortho-11. The ON scale (orto-11) has 11 four-point Likert questions with the following options: "always," "frequently," "sometimes," and "never." The items on the scale are scored between 1 and 4, and there are some reverse-coded items. Low scores indicate a high tendency to ON.[21]

Statistical Analysis

Descriptive statistics were employed in data assessment. Normality assumptions were examined with the Kolmogorov–Smirnov test. To compare two independent group means, Student's t-test was used in parametric distributions and the Mann-Whitney-U test was employed in nonparametric distributions. In nonparametric distributions, three or more groups were compared with the Kruskal-Wallis H test. When the difference was found to be significant in the comparison of three or more group means, the Dunnett T3 test, a post-hoc test, was employed. In nonparametric distributions, Spearman correlation was employed to reveal association of two continuous variables. The correlation coefficient was interpreted as follows: ≤0.25, very weak; 0.26-0.49, weak; 0.50-0.69, moderate; 0.70-0.89, strong; ≥0.90, very strong.[22] SPSS 26.0 was utilized to analyze the data. $p<0.05$ showed the threshold for statistical meaning.

RESULTS

Table 1 gives participants' sociodemographic characteristics. Mean age was 35.27±10.22 years (min.: 20 and max.: 58), 71.5% had an associate or undergraduate education, 75.9% were female, and 58.1% were married. Healthcare workers made up 61.1% of the research group, 34.4% of which were from the nursing profession (Table 1).

Table 2 shows the distribution of participants' anthropometric measurements. The mean BMI was 25.16±4.97 (min: 15.58, max: 40.40) kg/m² among women. The average BMR of the women was 1377.77±136.16 kcal. The average body fat percentage (%) of the women was 29.58±8.20 (Table 2).

The mean BMI was 25.02±3.99 (min.: 16.51 and max.: 35.36) kg/m² among men. The average BMR of the men was determined as 1918.32±265.56 kcal. The average body fat percentage (%) of the men was 13.90±9.10 (Table 2).

The mean BMI was 25.12±4.75 (min.:15.58 and max.: 40.40) kg/m² (Table 2). According to the BMI distribution of the group, 4.4% were underweight, 52.2% were normal weight, 28.1% were overweight, 11.9% had first-degree obesity, 2.2% had second-degree obesity, and 1.1% had severe obesity (not included in the tables).

Table 3 shows associations among participants' total and/or sub-domain figures of the orto-11, mindful eating scale, and intuitive eating scale (Table 3).

The mean orto-11 total score had a very small but statistically meaningful positive association with the emotional eating sub-domain score (r:0.233, p=0.000) and a very small, negative, and statistically meaningful association with (r:-0.122, p=0.046) the conscious eating sub-domain score of the MEQ-30 (Table 3).

A very small but and statistically meaningful positive association was detected the mean scores of the total orto-11 and the total IES-2 (r: 0.175, p=0.004). The mean orto-11 total score had a very weak and statistically significant positive correlation with the UPE (r: 0.228, p=0.000) and the EFPR sub-domain (r: 0.140, p=0.022) scores and a very weak, negative, and statistically meaningful negative association with the BFCC Factor (r: -0.180, p=0.003) of the IES-2 (Table 3).

The total scores on the IES-2 and MEQ-30 exhibited a small and statistically meaningful positive association (r: 0.480, p=0.000). A statistically meaningful positive relationship was detected between the total item score of the IES-2 and the MEQ-30 sub-domain scores, such as disinhibition (r:0.359, p=0.000), emotional eating (r:0.574, p=0.000), eating control (r:0.242, p=0.000), eating discipline (r:0.238, p=0.000), conscious eating (r:0.122, p=0.046), and interference (r:0.147, p=0.016) (Table 3).

The item score of UPE sub-domain of the IES-2 and the total item score of the MEQ-30 exhibited a weak and statistically meaningful negative association (r:-0.374, p=0.000). A negative, statistically meaningful association was detected between the UPE sub-domain and the sub-domains of the MEQ-30, namely disinhibition (r: -0.267, p=0.000), emotional eating (r: -0.149, p=0.014), eating control (r: -0.222, p=0.000), eating discipline (r: -0.285, p=0.000), conscious eating (r: -0.376, p=0.000), and interference (r: -0.297, p=0.000) (Table 3).

A moderate-level and statistically meaningful positive relationship was detected between the EFPR sub-domain of the IES-2 and the MEQ-30 (r: 0.569, p=0.000). The EFPR sub-domain and the sub-domains of the MEQ-30, such as disinhibition (r: 0.442, p=0.000), emotional eating (r: 0.706, p=0.000), eating control (r: 0.228, p=0.000), eating discipline

Table 1. Distribution of participants' sociodemographic characteristics

Variables	n	%
Gender		
Female	205	75.9
Male	65	24.1
Age (year) (mean±SD: 35.27±10.22. min.: 20. maks.: 58)		
<25	59	21.9
25-34	71	26.3
35-44	78	28.9
≥45	62	23.0
Marital status		
Married	157	58.1
Single	113	41.9
Education		
Elementary school	13	4.8
Middle school	11	4.1
High school	39	14.4
Undergraduate degree	193	71.5
Master's degree or PhD	14	5.2
Field		
Healthcare worker	165	61.1
Administrative staff	105	38.9
Job		
Physician	10	3.7
Nurse+midwife	100	37.1
Dietician+physiotherapist+psychologist	23	8.5
Pharmacist	15	5.6
Health technicians	17	6.3
Officer	4	1.5
Civil servant	18	6.7
Cleaning staff	35	13.0
Secretary	25	9.3
Security guard+police+engineer+worker	23	8.3

SD: Standard deviation, Min: Minimum, Max: Maximum

Table 2. Distribution of participants' anthropometric measurements

	Female				Male			
Measurements	**n**	**Mean±SD**	**Minimum**	**Maximum**	**n**	**Mean±SD**	**Minimum**	**Maximum**
BMI (kg/m²)	205	25.16 (4.97)	15.58	40.40	65	25.02 (3.99)	16.51	35.36
BMR (kcal)	205	1377.77 (136.16)	1099.00	1864.00	65	1918.32 (265.56)	1320.00	2703.00
Body fat percentage (%)	205	29.58 (8.20)	9.40	48.30	65	13.90 (9.10)	5.00	49.70
BMI (kg/m²)	270 (Total)	25.12 (4.75)	15.58	40.40				

BMI: Body-mass index, BMR: Basal metabolic rate, SD: Standard deviation

Table 3. Relationship with participants' mindful eating questionnaire, intuitive eating scale, and Orthorexia Nervosa Scale total and/or sub-scale scores

Scales	**n**	**Orthorexia Nervosa Scale-11 (Orto-11)**		**Intuitive eating scale -2 (IES-2)**									
				Total		**Unconditional permission to eat**		**Eating for physical rather than emotional reasons**		**Reliance on hunger and satiety cues**		**Body-food choice congruence**	
		r	**p**	**r**	**p**	**r**	**p**	**r**	**p**	**r**	**p**	**r**	**p**
Mindful eating questionnaire (MEQ-30)	270	0.039	0.525	0.480	0.000***	-0.374	0.000***	0.569	0.000***	0.508	0.000***	0.235	0.000***
Disinhibition	270	0.037	0.541	0.359	0.000***	-0.267	0.000***	0.442	0.000***	0.361	0.000***	0.134	0.027*
Emotional eating	270	0.233	0.000***	0.574	0.000***	-0.149	0.014*	0.706	0.000***	0.382	0.000***	0.149	0.014*
Eating control	270	0.001	0.985	0.242	0.000***	-0.222	0.000***	0.228	0.000***	0.338	0.000***	0.148	0.015*
Mindfulness	270	-0.025	0.686	0.093	0.127	-0.014	0.814	0.111	0.068	0.153	0.012*	0.048	0.437
Eating discipline	270	-0.093	0.128	0.238	0.000***	-0.285	0.000***	0.216	0.000***	0.335	0.000***	0.309	0.000***
Conscious eating	270	-0.122	0.046*	0.122	0.046*	-0.376	0.000***	0.186	0.002**	0.253	0.000***	0.086	0.160
Interference	270	-0.017	0.780	0.147	0.016*	-0.297	0.000***	0.274	0.000***	0.160	0.009**	0.122	0.045*
Intuitive eating scale-2 (IES-2)	270	0.175	0.004**	-	-	-	-	-	-	-	-	-	-
Unconditional permission to eat	270	0.228	0.000***	-	-	-	-	-	-	-	-	-	-
Eating for physical rather than emotional reasons	270	0.140	0.022*	-	-	-	-	-	-	-	-	-	-
Reliance on hunger and satiety cues	270	0.071	0.248	-	-	-	-	-	-	-	-	-	-
Body-food choice congruence	270	-0.180	0.003**	-	-	-	-	-	-	-	-	-	-

*p<0,05, **p<0,01, ***p<0,001. Spearman's rho

(r: 0.216, p=0.000), conscious eating (r: 0.186, p=0.002), and interference (r: 0.274, p=0.000), yielded a positive, statistically meaningful association (Table 3).

The reliance on hunger and satiety cues sub-domain of the IES-2 and the MEQ-30 had a moderate-level, positive, and statistically meaningful association (r: 0.508, p=0.000). A positive, statistically meaningful association was detected between the reliance on hunger and satiety cues sub-domain and the MEQ-30 sub-domains, namely disinhibition (r:0.361, p=0.000), emotional eating (r:0.382, p=0.000), eating control (r:0.338, p=0.000), mindfulness (r:0.153, p=0.012), eating discipline (r:0.335, p=0.000), conscious eating (r:0.253, p=0.000), and interference (r:0.160, p=0.009) (Table 3).

A very small and statistically meaningful positive association was detected between the item score of the BFCC sub-domain of the IES-2 and the total item score of the MEQ-30 (r:0.235, p=0.000). A statistically significant positive relationship was determined between the item score of the BFCC sub-domain and the item scores of the disinhibition (r: 0.134, p=0.027), emotional eating (r: 0.149, p=0.014), eating control (r: 0.148, p=0.015), eating discipline (r:0.309, p=0.000), and interference (r:0.122, p=0.045) sub-domains of the MEQ-30 (Table 3).

DISCUSSION

ON is frequently prevalent today. It is thought to have a negative association with mindful eating and intuitive eating.[1,23] Developing mindful and intuitive eating can potentially promote general health and well-being in individuals.[1] Reflecting on all this information, the objective of this cross-sectional research was to study the associations of ON, mindful eating, and intuitive eating in adult individuals comprehensively.

In studies on ON and mindful eating associations, it was determined that as the orthorexic tendency increased, "emotional eating", one of the mindful eating sub-domains, decreased, similar to the results in this research.[2,24] This result may be based on the idea that orthorexic individuals have an increased desire to eat when they feel tense, excited, happy, or guilty.[2]

As the orthorexic tendency increased in the present research, "conscious eating", one of the mindful eating sub-domains, also increased. In similar study conducted in parallel with this study, as concerns about healthy nutrition increased in individuals with orthorexia, conscious eating, one of the sub-domains of mindful eating, also increased.[24] There is

an increase in healthy eating behaviors in individuals with orthorexia, which increases their tendency towards conscious eating.[25,26]

In the study conducted in parallel with this study, an increase in orthorexic tendency decreased intuitive eating.[5] This may be because individuals with orthorexia have anxiety and guilt psychology related to food and cannot show unconditional eating behavior without listening to their body and distinguishing foods as good or bad.[6]

A study about the evaluation of ON and intuitive eating associations revealed that as orthorexic tendency increased, "UPE" and "EFPR", which are sub-domains of intuitive eating, decreased.[5] In parallel with this study, as orthorexic tendency increased, "BFCC", which is a sub-domain of intuitive eating, increased, as well.[5] Actions taken on healthy nutrition are conceptualized by this fact of intuitive eating to a certain extent and are thought to be associated with food choices that support health in the body.[17] However, it has been seen that restrictive nutrition and strict food rules at high levels are associated with distress and deterioration, regardless of their focus.[27]

In studies on mindful and intuitive eating associations, parallel to the results in the present research, a positive association was detected between mindful eating and intuitive eating.[23,28] In some studies, consistent with the findings in the present research, as intuitive eating increased, the sub-domains of mindful eating, namely "disinhibition," "emotional eating," "eating control," "eating discipline," "conscious eating," and "interference" also increased and that as the "EFPR", one of the sub-domain of intuitive eating, increased, the total score of the mindful eating scale also increased.[29,30] Since mindful eating emerged as a response to physical hunger and satiety, EFPR, one of the sub-domains of the IES-2, also increased.[3]

In similar studies conducted parallel to the present research, a statistically meaningful negative association was detected among the mean scores on the "UPE" sub-domain score of the IES-2 and the total and sub-domains of the mindful eating scale, namely "disinhibition," "emotional eating," "eating discipline," and "interference". Contrary to these studies, Anderson et al.[8] did not detect any relationship.

In another study with parallel results to this study, a positive, statistically meaningful association was detected between the item scores of the reliance on hunger and satiety cues sub-domain of the IES-2 and the interference sub-domain of the MEQ-30 (r:0.160, p=0.009). It is thought that individuals who pay more attention to their internal and external experiences trust their bodies' hunger and satiety cues more.[28]

Previous research into the investigation of how intuitive and mindful eating were related to eating habits included positive, negative, significant, and insignificant results, which were parallel to this study. These different results regarding the relationship between intuitive eating and mindful eating[8,28] suggest that they may have different effects on food intake. Considering these issues, it is thought that further studies that will simultaneously include intuitive eating, mindful eating, and their connection to food intake are needed.[30]

Strengths of The Study

In the literature, no study has been found that examines the relationships between mindful eating, intuitive eating and ON specifically on healthcare professionals. In this respect, our study fills an important gap in the field. In addition, it is thought that the findings can guide both academic research and practical applications by providing new perspectives on understanding the eating behaviors of individuals working in the healthcare field.

Limitations

There are some limitations to this study. First of all, the cross-sectional design of the study makes it difficult to make direct inferences about cause-effect relationships. Considering the complex structure of eating behaviors and the various factors that affect these behaviors, longitudinal studies are needed to better understand the dynamics of these relationships over time. In addition, it is known that there are differences between genders in studies on intuitive eating and mindful eating. It is stated in the literature that female participants constitute the majority in such studies and that the participation rate of male participants in studies is lower. This situation also emerged as a limitation in our study. In the future, studies conducted with samples with a more balanced distribution in terms of gender may provide healthier comparisons between genders. In addition, the limited number of studies on eating disorders and the fact that existing studies include different sample groups, application methods and analysis techniques make it difficult to evaluate the general validity and clear results obtained. Conducting more research in the field and developing standard methods will contribute to obtaining more reliable and comparable results in future studies.

CONCLUSION

This study contributed to the identification of the relationship between the risk for ON and mindful eating and intuitive eating behaviors in adults. As individuals' tendency toward orthorexia increased, intuitive eating decreased, while "emotional eating" decreased and "conscious eating" increased. It was also observed in the study that as intuitive eating increased, mindful eating also increased. In the mindful eating approach, the individual decides physically rather than emotionally about why, how much, and when to eat. Therefore, mindful eating should be increased to prevent emotional eating in individuals with orthorexia. It is possible to successfully improve individuals' concerns about eating by developing and implementing intuitive eating behavior. Intuitive eating is also based on hunger and satiety cues to regulate food intake. Therefore, it also supports body weight control along with a decrease in BMI. Mindful eating should be increased and intuitive eating behavior should be developed in individuals with orthorexia. Thus, it will be possible to better manage the treatment process of individuals with orthorexia.

In eating disorders such as ON, intuitive and mindful eating approaches should be developed and used together. Also, more comprehensive and extensive studies should be conducted on this subject.

ETHICAL DECLARATIONS

Ethics Committee Approval

In order to conduct the research, the approval of the İstanbul Okan University Health Sciences Institute Ethics Committee was obtained (Date: 10.05.2023, Decision No: 166).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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